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Parent-initiated Motivational Climate and Young Athletes' Intrinsic-Extrinsic Motivation: Cross-sectional and Longitudinal Relations

Daniel J O'Rourke[1], Ronald E Smith[1]*, Frank L Smoll[1] and Sean P Cumming[2]

[1]*Department of Psychology, University of Washington, Seattle, Washington 98195-1525, USA*
[2]*School of Health, University of Bath, Bath, UK*

Abstract

Sport is an important developmental context for children, and experiences involving parents, coaches, and peers affect a variety of important psychosocial outcomes, including motivational processes. Linking concepts from achievement goal theory with motivational constructs in self-determination theory, this study examined relations between the motivational climate created by parents and both the nature and changes in sport-related motivation in young athletes, using Grolnick and Ryan's autonomous regulation index, which summarizes the relative strength of intrinsic and extrinsic forms of motivation. We followed a sample (*N*=308) of 9-14 year old swim club athletes during a 32-week season, measuring their reports of the parent-initiated motivational climate as well as autonomous regulation at the beginning of the season, at midseason, and at the end of the season. Cross-sectional analyses at each point revealed that children whose parents created a mastery climate, which defines success in terms of enjoyment of the activity, self-improvement, and effort, reported higher levels of autonomous regulation (intrinsic motivation) than did those whose parent created an ego climate that emphasized winning, avoidance of mistakes, and ability comparison with others. In contrast, ego climate scores were positively related to extrinsic motivation scores. Girls exhibited higher autonomous regulation than did boys. An extreme-groups longitudinal analysis showed that children exposed to a strong mastery environment exhibited higher autonomous regulation and increased in autonomous regulation from mid-season to late-season, whereas an ego-climate group decreased in internal regulation during this interval.

Keywords: Autonomous regulation; Intrinsic-extrinsic motivation; Parent-initiated motivational climate; Youth sports

Introduction

Parent-child relationships are fundamental to a child's development and overall well-being [1,2]. Parental influences extend to virtually all areas of a child's life. One important domain is sports, which is an important behavior setting for many children throughout the world. In the United States alone, an estimated 60.3 million youngsters 6-to-18 years of age participate in agency-sponsored sports, such as Little League Baseball, the American Youth Soccer Organization, and the Boys and Girls Clubs [3]. Additionally, about 7.7 million youths participate in high school sports [4]. Understandably, therefore, researchers have focused increased attention on how sport experiences, including parent-child relationships, influence a child's sport outcomes [5-8]. This literature demonstrates that the nature of parental involvement influences a range of psychosocial outcomes in sport, including stress, enjoyment, motivation, and attrition [1,9,10]. Our present focus is on the role that children's perceptions of parents play on motivational processes in sport.

Deci and Ryan's self-determination theory (SDT) has special relevance to sport-related motivation. SDT focuses on factors that influence the development of motivation, particularly intrinsic and extrinsic motivation. The relative strength of intrinsic and extrinsic motivation determines an individual's sense of autonomy, the extent to which behavior is viewed as self-governed [11]. Together with competence (the perceived mastery over behavior) and relatedness (the perceived sense of belonging), autonomy is considered a basic need that facilitates psychological well-being [12]. SDT proposes that the social environment, including parental behaviors, influences the extent to which these basic needs are satisfied.

SDT holds that internal and external behavioral goals are distributed on a continuum of self-determination. On the self-determined end lies intrinsic motivation, where actions are performed in the service of inherent enjoyment of the activity. The continuum also contains three different variants of extrinsic motivation. From higher to lower self-determination, these are termed identified regulation (in which behavior is related to other goals, such as engaging in the sport to lose weight or improve conditioning), introjected regulation (where behavior functions to avoid an negative emotion or for ego enhancement), and external regulation (where the behavior is performed for external reasons, such as tangible awards or the avoidance of punishment). Generally, as behavior is guided more by external incentives, positive qualities of human nature are hindered, whereas greater self-determination or autonomy allows positive qualities to flourish [12]. There is an imposing literature supporting this contention and demonstrating greater intrinsic motivation under conditions that support feelings of autonomy, competence, and relatedness [11,13-16].

According to SDT, the social environment influences satisfaction of the basic needs and can facilitate the development and maintenance of intrinsic motivation. Coaches and parents are important contributors to the sport environment, and we should expect them to influence sport outcomes, including autonomy [1,8,9,17]. Understanding how this occurs in sport, which is inherently an achievement context, is advanced

***Corresponding author:** Ronald E Smith, Department of Psychology, Box 351525, University of Washington, Seattle, WA 98195-1525, USA, Tel: (206) 543-8817; 543-6511; Fax: (206) 616-8367; E-mail: resmith@uw.edu

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by incorporating concepts from achievement goal theory (AGT) [18], a related motivational theory that focuses on conceptions of success and the environmental conditions that influence them. AGT's primary tenet is that in achievement situations, individuals are motivated to display competence and/or to avoid displays of incompetence. AGT posits two separate conceptions of success represented in mastery and ego achievement goal orientations. Athletes with a mastery orientation, conceptualize success in a self-referenced manner, defined in terms of personal improvement, enjoyment, effort, and learning from mistakes. In an ego orientation, success is other-referenced, achieved through winnng, outperforming others or equaling their level of performance using minimal effort, and avoiding mistakes [19-22].

According to AGT, how an individual defines success and competence is influenced by interacting dispositional and environmental factors. Environmental conditions that emphasize and reinforce mastery or ego success criteria comprise the motivational climate [19,23]. AGT posits two types of motivational climates that promote either mastery or ego conceptions of success. A mastery climate reinforces enjoyment, effort, and self-referenced improvement, viewing mistakes as a valuable tool for learning. In an ego climate, winning is emphasized, success is achieved through positive social comparison involving a higher level of performance with equal or less effort, greater attention is paid to the most competent athletes, and mistakes are negatively evaluated and often punished [19,21,22]. Consistent with AGT, a large body of research shows that mastery and ego climates promote and strengthen corresponding mastery and ego goal orientations [24,25]. A mastery climate is also related to a host of salutary outcomes including enhanced enjoyment and performance, decreased performance anxiety, higher levels of self-esteem, and lower rates of sport attrition [21,26,27].

Integrating SDT and AGT may provide valuable insights into the development of intrinsic and extrinsic motivation. SDT posits that autonomous regulation, conceptualized as the relative balance of intrinsic and extrinsic sources of motivation, is influenced by the social environment, while AGT provides a theoretical explanation for how the environment can influence autonomous regulation [16,28]. Theoretically, a mastery climate is autonomy-supportive because there is a focus on enjoyment, effort, self-referenced learning and a relative absence of normative comparison. Under such conditions, evaluative concerns should be lowered while intrinsically motivated values are enhanced [19,21,22]. Conversely, an ego climate is theoretically not autonomy-supportive because its focus on normative and social comparison, punishment of mistakes, and general evaluation, results in outcome-dependent goals that are externally oriented and less under personal control [13].

To this point, research relating motivational climate to autonomous regulation has focused almost exclusively on the motivational climate promoted by the coach climate. Consistent with theoretical expectations, a coach-initiated mastery climate has been shown to be strongly and positively linked with greater autonomous regulation [16,29,30]. A focus on effort, enjoyment and self-referenced improvement appears to satisfy not only the need for autonomy but also the needs for competence and relatedness [15,16,28]. However, counter to predictions derived from AGT and SDT, negative relations between an ego climate and autonomous regulation have been largely lacking. For example, in a study involving university athletes, Reinboth and Duda [16] measured relations between two separate facets of autonomous regulation (internal perceived locus of causality and decision-making) and coach-initiated motivational climate. They found no significant correlations between an ego climate and autonomous regulation at two separate time points (r=-0.01 and -0.15, respectively). Similarly, in a study involving high school physical activity teachers, Lavigne and colleagues [28] found no relation between teacher-initiated ego climate and situational motivation in high school youths. In physical activity classes, Standage et al. [30] also failed to find relations between ego climate and autonomous regulation. Finally, in a study involving female high school athletes Kipp and Amorose [15] found that two key facets of an ego climate, unequal recognition based on ability and promotion of intra-team rivalry, were unrelated to autonomous regulation. Only the external contingency of punishment for mistakes facet significantly predicted lower autonomous regulation.

Currently, our knowledge concerning the impact of adult-initiated motivational climates on young athletes' autonomous regulation is limited by two main factors. First, previous research in sport has focused on older individuals, typically 15 years of age and above, who may already have relatively well-established autonomous regulation levels that are less influenced by the current motivational climate. Though there is a paucity of research in this area, motivational development in younger athletes may be less guided by dispositional tendencies and more malleable than in older athletes. Because of theoretical assumptions [18], AGT has been traditionally applied to children beyond 11 years of age. However, recent research demonstrates that AGT can be extended downward to younger sport participants if self-report measures have applicable reading levels [31,32]. Second, previous research has focused exclusively on coaches, and little is known about how the parent-initiated motivational climate as perceived by a child affects autonomous regulation. There is a literature supporting an important role of parental autonomous regulation-supportive behaviors in academic domains [33-35], but these studies did not employ AGT-derived measures of climate. To our knowledge, the effect of perceived parent-initiated motivational climate upon autonomous regulation has not been studied. Finally, because the present research considers these dynamics across the duration of a sporting season, it significantly advances a literature that typically fails to address changes in motivation over time.

The present study was designed to address these factors. First, we focused on a younger (and perhaps more influenced by parents) athlete sample than has been previously studied. Second, we addressed cross-sectional relations between perceived parent-initiated motivational climate and autonomous regulation at three time points in a sporting season. Finally, we carried out longitudinal analyses to assess changes in autonomous regulation over the course of the season as a function of motivational climate.

The current study tested two hypotheses. We predicted that at all time points, significant positive relations would exist between perceived parental mastery climate and children's level of autonomous motivational regulation, with no relation (based on previous findings with coaches) or a negative relation (based on AGT propositions) between ego climate and autonomous regulation. We also predicted that a high parental mastery climate would be related to positive changes in autonomous regulation over the course of the sport season, while a high ego climate will demonstrate either no relation or a decline in autonomous regulation.

Methods

Participants

Participants were 308 youth swimming athletes (124 boys and 184

girls, *M* age=11.88, *SD*=1.34, age range=9-14 years) participating in a regional swimming program associated with USA Swimming. The ethnic membership was 71.0% Caucasian, 13.2% Asian, and 15.8% representing other ancestries. They had been, on average, club members for 3.30 (*SD*=2.03) years and had engaged in competitive swimming since age 7 (*M*=7.27, *SD*=2.22). Athlete participation involved daily weekday practices and competitive meets on weekends, with the season extending from August to the following May. Athletes were coached by professionals employed by the clubs. The attrition rate in our study was 2.29% from early- to mid-season and 24.5% from early- to late-season because of lowered attendance at practices by season's end after competitive meets had ended. Athletes who failed to provide data at late-season did not differ significantly at the beginning of the season from those who did on any of the measures used in this study.

Measures

Parent-initiated motivational climate: We used the Parent-Initiated Motivational Climate Questionnaire-2 (PIMCQ-2; [8]) to assess children's perceptions of the parent-initiated motivational climate. The 36-item (18 items for each parent) PIMCQ-2 normally provides scores on three subscales, one reflecting mastery orientation (learning and enjoyment subscale) and two reflecting ego orientation (success-without-effort and worry-conducive behaviors). Our data, based in part on an age group younger than that in which the scale was originally developed, failed to produce the three-factor solution reported by Duda and Whitehead [36]. Instead, asking athletes to characterize the behaviors of the parent who is most involved in the athlete's sport experience, we found a clear two-factor structure with a mastery-related factor (containing the items from the learning and enjoyment subscale) and a single ego factor (containing the combined items from the success-without-effort and worry-inducing ego subscales).We therefore selected the same nine items used in previous research(all with factor loadings exceeding 0.40 and a mean loading=0.62 in our sample) to create a parent-initiated mastery climate scale (e.g. "is most satisfied when I learn something new") and the same nine items used in previous research (mean loading=0.64) to measure ego climate (e.g. "looks satisfied when I win without effort"). Children responded to the stem "I feel that my mother/father/guardian…" on a 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree) for each item. Confirmatory factor analysis of the adapted scale has supported this 2-factor solution [7]. Internal consistency was acceptable in the present sample at all three time points (Cronbach's alpha=0.76 to 0.79 at three time periods for the mastery climate scale and 0.83 to 0.85 for the ego climate scale). A Flesch-Kincaid readability analysis of the scales placed the reading level at Grade 5.5 (approximately age 11). Given the relatively high socioeconomic and educational characteristics of the current sample, we judged the scale appropriate for use in our sample.

Self-determined motivation: Swimming-related motivation was measured using a version of the Connell and Ryan [37] Self-Regulation Questionnaire adapted for use in the sport domain by Gagne et al. [11]. The scale consists of 15 items designed to measure a continuum consisting of intrinsic motivation, three types of extrinsic motivation that vary in terms of the degree to which they are congruent with and emanate from the self, plus an amotivation (absence of motivation) subscale. Items relevant to each type of motivation are answered in response to the question, "Why do you swim?" Responses are made on a rating scale that extends from1 (not true at all) to 7 (very true). Three items each assess intrinsic motivation (e.g. "For the pleasure I feel when I swim"), identified regulation (e.g. "It is a good way to get exercise"), introjected regulation (e.g. "I would feel bad about myself if I was not taking time to swim"), external regulation (e.g. "My parents or other family members give me money or other rewards when I do it"), and amotivation (e.g. "It is not clear to me anymore; I don't really think swimming is my sport"). This study focused on the first four (autonomous regulation) variables, and not on amotivation, which does not contribute to the autonomous regulation index that served as the outcome variable.

Scores on the subscales can be combined to create an autonomous regulation score that provides an overall index of self-determined motivation. This index has been used in previous research on intrinsic motivation in athletes as well as other populations [11,38]. The autonomous regulation index is based on the proposition that actions governed by identified regulation share some noteworthy features of internalization and self-acceptance with intrinsic motivation. In contrast, introjected regulation involves self-esteem maintenance rather than intrinsic task involvement and is conceptually more similar to extrinsic motivation based on external contingencies. Using per item means, the relative autonomous regulation index (RAI) is derived from the subscales using the following mean-per-item formula: 2 (intrinsic motivation) + 1 (identified regulation) – 1 (introjected regulation) – 2 (external regulation). Alpha coefficients for the relative autonomous regulation index averaged.69 over the three measurement periods. The subscales exhibited an average alpha of 0.64 across the season. These values are similar to those reported by Gagne et al. [11] and Grolnick and Ryan [38].

Procedure

We administered the climate and motivational regulation measures to groups of athletes on three separate occasions over a 32-week period. Athletes were given a series of paper and pencil questionnaires at early-season, 16 weeks later at mid-season, and another 16 weeks later near the end of the season. In compliance with the terms of institutional review board approval, we obtained parental consent prior to the study and athlete assent at each time point. Parents were not present. Trained research assistants arranged the data collection sessions with the organizations' administrators. Coaches were informed that our research was intended to study influences on athletes' attitudes and outcomes in youth sport participation, while athletes were told that the research was intended to promote greater understanding of their experiences in sport. To enhance the likelihood of valid and complete data, we told athletes prior to the season that they would be given a $4 Baskin-Robbins ice cream gift certificate after each questionnaire session to provide a reward for their responding to each item carefully and accurately.

Results

At all three time periods, athletes reported significantly ($p<0.0001$) higher mastery climate scores (*M*=30.31, *SD*=4.01) than ego scores (*M*=15.54, *SD*=5.13), indicating a general tendency for more mastery-oriented behaviors. Consistent with theoretical expectations, mastery and ego climate scores were negatively correlated (-0.36 at Time 1, -0.40 at Time 2, and -0.42 at Time 3), but these correlations are not as high as those reported in older athlete samples [8].

We also assessed temporal stability of the variables across the three time periods. While mastery climate scores averaged lower 16-week temporal stability coefficients (0.55) than did ego climate scores (0.69) over the three measurement periods, all stability coefficients were highly significant. The relative autonomous regulation index demonstrated good temporal stability for the three measurement

periods, averaging 0.69 overall, although the other SMS scales exhibited lower average stability (intrinsic=0.58, identified=0.44, introjected=0.57, external=0.71). Despite moderate to good stability, the magnitude of the coefficients also indicated capacity for change over time on all of the measured variables.

Our analyses addressed several related empirical questions. First, we considered the cross-sectional relation between perceived parent-initiated motivational climate and autonomous regulation at each of the three measurement points, allowing us to determine the replicability of relations across the season. Second, we assessed the relations between perceived motivational climate at the beginning of the season and potential changes in autonomous regulation, using a prospective longitudinal analysis in which we controlled for early-season scores on the motivational variables. For all analyses, we included gender and age due to the possibility that they might moderate relations.

Cross-sectional analyses of parent motivational climate and autonomous regulation

Descriptive statistics for the motivational climate and motivational regulation scores at all measurement periods for boys and girls are shown in Table 1. Cross-sectional relations between the motivational variables and the mastery and ego climate scales at each time period are shown in Table 2. Boys and girls correlations were very similar and therefore not presented. A consistent pattern of relations between perceived parental motivational climate and athlete motivation occurred at all three time points. Mastery climate scores were positively associated with intrinsic motivation and identified regulation, which fall at the self-determined end of the continuum. Introjected regulation showed a less consistent pattern, with mastery scores being positively related and ego scores non-significant or positively correlated. On the external regulation scale, which reflects extrinsic motivation, mastery scores were negatively related and ego scores positively related. Finally, on the relative autonomous regulation index, mastery climate was consistently associated with higher internal regulation at each time point at an average value of +0.40, whereas ego climate was negatively correlated at a mean value of -0.43. Analyses of differences between dependent correlations revealed that the majority of the differences in mastery and ego correlational coefficients were statistically significant beyond the 0.001 level, the only exception being no significant difference between the late-season introjected regulation coefficients.

To assess the effects of age, sex, and motivational climate on autonomous regulation, we then conducted a hierarchical multiple regression analysis at each time point, entering age of athlete and gender, and mastery and ego climate together as the predictor variables and autonomous regulation as the criterion variable, controlling for gender and age. As shown in Table 3, age did not yield a significant effect at any of the measurement periods, but gender did at Times 2 and 3, with girls exhibiting higher levels of autonomous regulation. The hierarchical analysis showed that at all three time points there were significant main effects for parent-initiated motivational climate after controlling for gender and age, F (2, 304)=44.47, p<.001, β (mastery)=0.24; β (ego)=-0.34; F (2, 295)=48.35, p <0.001, β (mastery)=0.29; β (ego)=-0.31; and F (2, 227)=42.47, p<0.001, β (mastery)=0.25; β (ego)=-0.37, respectively.

Parent motivational climate and longitudinal changes in autonomous regulation

A second important empirical question is whether perceived parental motivational climate predicts not only levels of intrinsic-extrinsic motivation, but also changes in motivation from the beginning to the end of the season. As an initial approach to this question we computed a Time 3 (end of season) minus Time 1 (early season) autonomous regulation change score. We then carried out a hierarchical regression analyses in which autonomous regulation change (autonomous regulation$_{time3}$ – autonomous regulation$_{time1}$) was regressed on early season parent motivational climate while controlling for early-season autonomous regulation, gender and age (Table 4). Early-season autonomous regulation was entered at step one, gender at step two, age at step three, and parent mastery and ego climate scores were entered as a block at step four. Due to the need for complete data sets at both time points, the number of participants (n=224) was lower than in the cross-sectional analyses.

	Early-Season (n = 306)	Mid-Season (n = 299)	Late-Season (n = 231)
Autonomous-Regulation	Total 20.72 (13.80) Boys 20.36 (14.43) Girls 20.95 (13.39)	Total 20.81 (13.20) Boys 17.99 (14.86) Girls 22.65 (12.76)	Total 23.69 (13.43) Boys 20.65 (13.70) Girls 25.79 (12.89)
Mastery Climate	Total 30.31 (3.61) Boys 30.32 (3.48) Girls 30.63 (3.48)	Total 30.15 (3.64) Boys 29.40 (4.18) Girls 30.63 (3.17)	Total 30.43 (3.81) Boys 29.62 (3.79) Girls 30.97 (3.73)
Ego Climate	Total 16.00 (4.94) Boys 17.26 (5.16) Girls 15.15 (4.62)	Total 15.12 (4.87) Boys 15.80 (5.17) Girls 14.68 (4.62)	Total 14.90 (4.78) Boys 16.33 (5.37) Girls 13.93 (4.09)

Table 1: Means and standard deviations of autonomous regulation, and parent-initiated motivational climate measures at early-, mid-, and late season.

	Early-Season MC/ EC	Mid-Season MC / EC	Late-Season MC / EC
Intrinsic	.50* -.25*	.54* -.20*	.54* -.19*
Identified	.44* -.18*	.41* -.20*	.46* -.11
Introjected	.33* -.05	.22* .03	.22* .14*
External	-.15* .38*	-.15* .41*	-.16* .48*
Autonomous Regulation	.36* -.41*	.42* -.42*	.41* -.48*

Note: Boys' and girls' coefficients were very similar, so only totals are presented. MC=Mastery climate, EC=Ego climate. N's=306 at early-season, 299 at mid-season, and 231 at late season measurement.
*=p<0 .05

Table 2: Correlations between mastery (MC) and ego (EC) parent-initiated motivational climate scores and motivational regulation variables and at early-, mid-, and late season respectively.

	Early-Season		Mid-Season		Late-Season	
Step	**R^2**	***F***	**R^2**	***F***	**R^2**	***F***
1.Gender	.00	.13	.03	8.87*	.04	9.62*
2.Age	.00	.23	.01	1.91	.00	.99
3.Parent Motivational Climate	.23	44.47*	.24	48.35*	.26	42.47*

*=p<.01

Table 3: Cross-sectional hierarchical regression analyses of autonomous regulation.

	Autonomous Regulation Season Change			
Step	**R^2 Increment**	**Standardized Beta Coefficients**		**F**
1.Autonomous Regulation Early-Season	.17	-.56		46.51*
2. Gender	.04	.15		11.14*
3.Age	.00	.10		.76
4. Parent Motivational Climate	.07	Mastery	.16	10.69*
		Ego	-.22	

*=p<0.001

Table 4: Hierarchical regression analyses for longitudinal changes in autonomous regulation.

Early-season autonomous regulation significantly predicted autonomous regulation change at step one F (1, 223)=46.51, p<0.01, indicating the need to control for Time 1 autonomous regulation scores. A significant effect of gender was shown at step two, F (1, 222)=11.14, p<0.01, with females seeming to increase in autonomous regulation to a larger extent than males. Age was not significant at step three, F (1,221)=0.76, p=0.38. A significant effect of parent-initiated motivational climate was clearly demonstrated at step four F (2, 219)=10.69, p<0.01, indicating that motivational climate scores were related to change in autonomous regulation during the season. Because of the relatively young age of the present sample, we conducted this same analysis with only those aged 12 years and above, 13 years and above, and 14 years and above. We discovered the same pattern of findings as reported above, across age groups.

To clarify the nature of the parent motivational climate effect while using all three time periods, we performed an extreme-groups analysis, selecting athletes whose parents obtained scores 0.5 SD above the means of the mastery and ego distributions and eliminating 8 participants whose parents had extreme scores on both scales. This procedure yielded a high mastery climate group containing 56 athletes and a group numbering 52 athletes whose parents fell into the top 30% of the ego climate distribution. The mean mastery climate score for the mastery group was 34.11, which corresponded to the 89th percentile of the total sample, whereas the ego climate group's mean score of 21.88 fell at the 88th percentile of the ego climate distribution. We then carried out a 2 (motivational climate groups)×2 (gender)×3 (time periods) repeated measures analysis of covariance (ANCOVA), with Time 1 autonomous regulation score serving as the covariate as in the regression analysis described above to assess mid- to late-season change.

The ANCOVA-adjusted group means on autonomous regulation at each time period are shown in Figure 1. A significant main effect for Groups occurred, F (1,103)=14.39, p<0.001, eta^2=0.12, with the children perceiving high mastery climate parents exhibiting higher autonomous regulation scores. A significant effect for Time occurred, F (2,102)=20.56, p<0.001, eta^2=0.29, indicating overall increase in autonomous regulation scores over the course of the season. This effect was qualified by a significant Motivational Climate Groups x Time interaction, F (2,102)=8.92, p<0.001, eta^2=0.15. As shown in Figure 1, with early-season scores controlled, the mastery climate group exhibited an increase in autonomous regulation scores from mid- to late-season, whereas the ego climate group decreased in autonomous regulation during that time period. No significant main effect for gender occurred within the extreme groups analysis, and no significant interactions between gender x time or motivational climate x gender x time were found. These results thus indicate not only a higher level of autonomous regulation but also differential patterns of motivational change in the extreme climate groups.

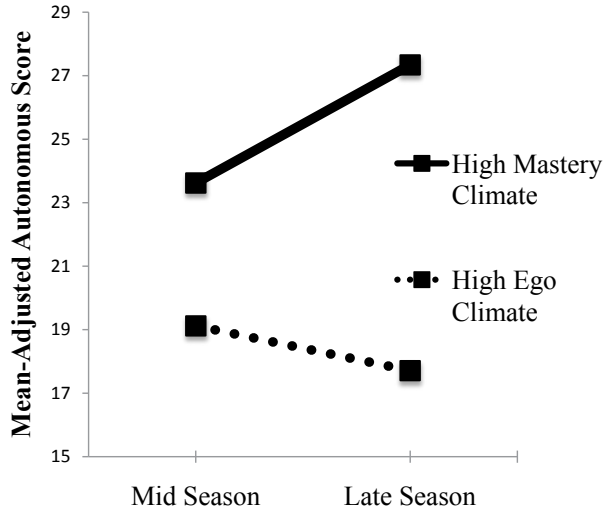

Figure 1: Changes in ANCOVA-adjusted (for early-season) mean autonomous regulation scores at mid-season and at the end of the season for children in extreme parent-initiated mastery and ego climate groups.

Discussion

Results of this study indicate that young athletes' intrinsic-extrinsic motivation was significantly related to their perceptions of the motivational climate created by their parents. Throughout the sport season, perceptions of a high parent mastery climate predicted the highest level of autonomous regulation (relative strength of intrinsic motivation), while a perceived high ego climate predicted the lowest levels of autonomous regulation. Moreover, an extreme-groups repeated measures analysis of change controlling for early-season autonomous regulation revealed a significant time x groups interaction, and the adjusted means in Figure 1 indicate that a high mastery climate resulted in increases in autonomous regulation during the second half of the season, whereas a high ego climate was associated with decreased autonomous regulation over that time period. Findings thus support hypotheses predicting salutatory effects of a mastery climate. They also suggest that a high ego climate is associated with lower autonomous regulation as well as decreased autonomous regulation over time.

The dynamics of parent-initiated motivational climates

To this point, the bulk of motivational climate research in sport has focused on the motivational climate initiated by the coach [16,28,30,39]. Results have supported the positive relation of coach-initiated mastery climate with intrinsic motivation that we have demonstrated with parents. Whether created by coaches or parents, a mastery climate appears to foster autonomous regulation and thus intrinsic motivation [14,28]. This seems attributable to the fact that a mastery climate emphasizes the importance of features (e.g. effort, enjoyment, mastery) that are more subject to the personal control of the athlete than in an ego climate where winning/losing or superiority over others are emphasized. Thus, over the course of a sport season, a child perceiving a parent-initiated mastery climate focuses on, and is rewarded for, behaving in a self-determined manner that fosters and enhances intrinsic motivation. Likewise, within a mastery climate, internal self-reinforcement processes may be engaged and strengthened as the child takes pride in non-normative improvement. It thus appears that children perceiving a parent-initiated mastery climate over the course of a season internalize intrinsic features of sport participation and tend to place less emphasis on sources of motivation based on external outcomes. Previous intervention research has shown that training coaches and parents to create a mastery climate results in increases in young athletes' mastery achievement goal orientation, a decrease in ego orientation, and reduced performance anxiety [26,40,41]. Thus, both prospective and intervention studies suggest that the promotion of a self-referenced conception of success, and a reduction in fear of failure that results from a mastery climate, enhances self-directed motivation.

Previous examinations of coach ego climate and the relative strength of athlete intrinsic-extrinsic motivation (autonomous

regulation) suggest a null relation between the two. Our findings indicate that a parent ego climate is associated with significantly lower autonomous regulation cross-sectionally than a mastery climate, and also with changes in motivational regulation. It is possible that autonomous regulation is lower in an ego climate because children perceive that parents are punishing mistakes, and reinforcing more external and uncontrollable outcomes than internally-controlled ones, thus undermining the development of intrinsic motivation. In particular, the punishing of mistakes by an external agent, whether coach, parent, or peers, may have specific detrimental effects upon autonomous regulation [15]. Our findings are consistent with the notion that children who perceive an ego parental climate begin focusing on extrinsic outcomes such as outperforming others and avoiding punishment during a sport season rather than on intrinsic reasons such as a sense of mastery, improvement, and self-satisfaction [8]. This is consistent with SDT, suggesting that an ego climate can undermine autonomous regulation insofar as it is controlling in its own right.

Although research on the role of a coach-initiated mastery climate is in line with our parent results, the impact of a coach-initiated ego climate is less clear. Although there is some support for the proposition that coach-initiated ego climate reduces autonomous regulation perceptions [15], ultimately resulting in sport dropout [42], other studies have found no relation between ego climate and autonomous regulation [16,28,30]. To provide a possible explanation for the inconsistent results, Reinboth and Duda [16] posit that perceptions of competence may moderate the effect of an ego climate. For example, individuals with high ability may be granted more autonomous regulation (e.g. decision making) within a team, or believe they have more control over their own actions and are less governed by the coach. Such autonomous regulation would help negate the other aspects of an ego climate. Though this argument is plausible, we suggest two ways in which a parent-initiated ego climate may differ from that provided by coaches in relation to autonomous regulation outcomes in youth sport.

First, a parent-initiated motivational climate focuses on the individual child, whereas, at least in team sports, a coach-initiated motivational climate usually involves an entire group of athletes who can be responded to differentially by the coach. Perceptions of competence that may moderate the effect of coach-initiated ego climate (e.g. relative freedom based on ability) are not typically operative within a parent-initiated ego climate because the climate is individual rather than group oriented. Thus, there are no within-team factors to blunt components of the ego climate, such as other-referenced success demands and punishment for inadequate performance that might degrade autonomous regulation. However, these crucial coach-parent differences are not operative with a mastery climate because all the motivational goals (e.g. enjoyment, effort, self-referenced improvement) can be successfully conveyed on both an individual and team basis.

The second possible reason why our findings differ from the coach-based literature is because a coach's influence is typically restricted to the sport environment, whereas a parent's influence is far more general and ultimately more potent, occurring over a long period of time and in varying achievement situations [33]. It is possible that parental behaviors in many different domains, such as academic, home, and leisure domains, influence autonomous regulation in sport to a greater extent than do coach behaviors, helping to account for differences between our results and previous research. That is, parents play an important and unique role for children that contribute to their sporting experience. For example, there is research indicating that parents may affect children's motivation in participation and learning roles, whereas coaches are more influential in instruction and assessment roles in sport [43]. In addition, previous research has also shown that parent-initiated motivational climate may interact with other parental behaviors, such as parental pressure, to influence outcomes such as anxiety [7]. While more research is needed, initial findings indicate that children's perceptions of parental behaviors contributes to their sporting experience in a similar, yet separate, manner to perceptions of coach behavior.

Limitations and Future Directions

Although our findings suggest a notable relation between a perceived parent-initiated motivational climate and autonomous regulation, additional research is needed to establish the pervasiveness of the relations of motivational climate to intrinsic-extrinsic motivation. Among the factors that might influence these relations are the nature of the sport (individual versus team), the gender and age of the athletes, and the motivational climate established by the coach. We might expect the effects of the parental motivational climate to be enhanced in individual sports, in which parents are heavily invested both emotionally and financially and are frequently present at practices and competitions over a long period of time. These conditions were clearly present in this study, conducted in a high-level swimming program where athletes had been involved for an average of three years, and often longer. The potential for parental pressure is high in such settings. Recent research suggests that parental pressure exerted within a parent-initiated mastery climate does not have the negative consequences that it does when it occurs within an ego climate [7]. However, the individual versus team sport distinction may not be the only one at work, for Lavigne et al. [28], who failed to find significant effects of a coach ego climate, also studied an individual sport.

Gender and age of athletes, and the existing coach-initiated climate, may be other important factors. Gender may be a potential moderator of perceptions of parent-initiated motivational climate and autonomous regulation outcomes. In particular, an interaction between the athlete gender and parent gender may influence perceptions of actual parent behavior. The age level in our study was also younger than it was in samples in which null relations were found between coach ego climate and autonomous regulation [16,28,30], although our analyses demonstrate similar findings when all athletes are at similar or older age ranges to previous research. Younger athletes may be more malleable than older ones. Presently, little is known about the relative potency of parent- and coach-initiated motivational climates, or the outcomes that accrue when the two climates are either consistent or inconsistent with one another. All of these constitute important empirical questions that are highly relevant to both the achievement goal and self-determination theories. It will also be important to fully assess actual occurrences of parental behaviors, differentiating between mothers and fathers, and compare these to perceptions of behavior, because our study was only measuring the perceived motivational climate of the parent most involved in sport.

All of the measures used in this study were provided by the athletes. Although the athletes' perceptions constitute the psychological situation to which they respond, we have no behavioral measures of parental behaviors that create the nominal motivational climate, nor do we have parental reports of their own conceptions of success, values, or behaviors. Such data could provide a different perspective on the motivational climate.

Finally, we should note that virtually all of the research that has been conducted in this domain, including the current study, has been correlational in nature. Although the analyses of change that we conducted are more suggestive than the cross-sectional correlational analyses, they, too, have limitations regarding the drawing of causal inferences. In the achievement goal domain, the most convincing evidence for the causal impact of a mastery climate has been provided by studies in which motivational climate was experimentally influenced using an intervention. These studies have shown that when a mastery climate is enhanced as a result of coach or parent interventions, athletes' motivational climate perceptions and their achievement goal orientations and anxiety are influenced in a salutary fashion [26,41,42]. Given the availability of empirically-supported motivational climate interventions for coaches and parents, research of this kind could readily be applied to other psychosocial outcomes, including the important motivational variables addressed in self-determination theory.

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